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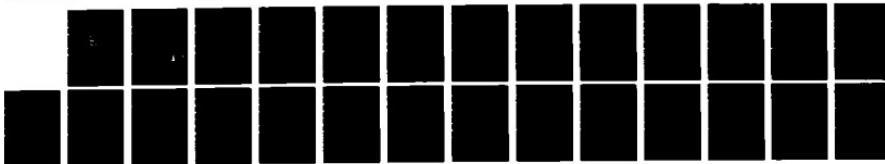
INTERNATIONAL WORKSHOP ON HIGH-LEVEL LANGUAGE COMPUTER
ARCHITECTURE(U) MARYLAND UNIV COLLEGE PARK DEPT OF
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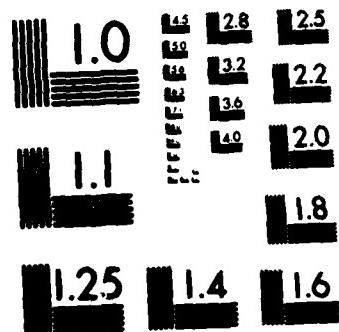
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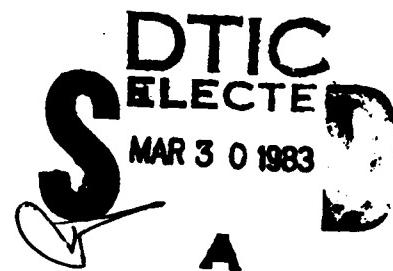
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ONR-N00014-82-G-0103

May, 1983

Final Report on the International Workshop on
High-level Language Computer Architecture



COMPUTER SCIENCE DEPARTMENT
UNIVERSITY OF MARYLAND
COLLEGE PARK, MARYLAND

20742

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Final Report on the International Workshop
on High-level Language Computer Architecture

Reported by Yaohan Chu

April 31, 1983

This is the final report for the International Workshop on HLLCA, organized by the Principle Investigator. This Workshop was made possible by the partial support from the AJPO and ONR. The activities of the Workshop are reported below.

1. Summary of the Grant

Title: International Workshop on High-level Language Computer Architecture

Period: June 1, 1982 to May 31, 1983

Grant No.: ONR-N00014-82-G-0103

Grant Amount: \$5,000

Principle Investigator: Professor Yaohan Chu
Department of Computer Science
University of Maryland
College Park, MD 20742
301-454-4245

A

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Justification	
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Distribution/	
Availability Codes	
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2. Workshop

Date: November 30 to December 3, 1983

Location: Fort Lauderdale, FL

Registrants: Technical program: (See Appendix A)
Tutorial program: (See Appendix B)

Programs: See Appendix C

Proceedings: A 250-page proceedings was distributed during the workshop.

3. Organization

The workshop is organized by the Workshop Committee. There are four members on the Workshop Committee; the names are shown in Appendix C. The Chairman of the workshop is Dr. Yaohan Chu.

The technical program is organized by the Program Committee whose chairman is Dr. Lee Hoevel. There are 10 members; the names of these members are also shown in Appendix C. There are 28 papers in 9 sessions including two panel discussion sessions. The details of this program are shown in Appendix C.

The tutorial program is organized by Dr. Yaohan Chu. There are two lecturers; each provides a set of notes. The names of the lecturers are also shown in Appendix C.

4. International Participation

The Workshop was highly international as there were participants from 13 countries:

- 1) Australia
- 2) Belgium
- 3) Canada
- 4) England
- 5) Finland
- 6) France
- 7) Germany (West)
- 8) Ireland
- 9) Japan
- 10) Singapore
- 11) Sweden
- 12) Switzerland
- 13) U.S.A.

5. Field Trip

A field trip was organized to visit IBM Boca Raton and Gould, Inc. (SEL Computer Systems Division). Thirty-four persons signed up for the trip.

6. Exhibits

Two computers were exhibited at the Workshop. The Lilith Modula-2 computer developed at Swiss Federal Institute of Technology and fabricated by Modula Research Institute of U.S.A. The other is the IBM Personnal computer.

7. Distribution List for Reports and Proceedings

<u>ADDRESSEE</u>	<u>NUMBER OF COPIES</u>
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Building 5, Cameron Station
Alexandria, VA 22314

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*On special request (see page 4), one copy of the Proceedings was sent to
Defense Logistics Agency on March 24, 1983.

Appendix A**High Level Language Computer Architecture
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Appendix CTutorial and Technical Programs

International Workshop on High-Level Language Computer Architecture

Date: Nov. 30, 1982 (Tutorial)
Dec. 1-3, 1982 (Workshop)

Location: Bahia Mar Hotel
Fort Lauderdale, Florida 33316
305-764-2233

Tutorial Program Tuesday, November 30, 1982

Tutorial on Language Modula-2 and Computer Lilith

Lecturer: Dr. Jiri Hoppe
Institute for Informatics
Swiss Federal Institute of Technology
Zurich, Switzerland

- 8:00 - 8:30 am Registration
- 8:30 - 8:45 am Welcome by Tutorial Chairman
- 8:45 - 10:15 am Introduction to Modula-2
- Modula-2 is a further development of Pascal by Prof. N. Wirth at the Swiss Federal Institute of Technology. The concepts of Pascal were enhanced by introduction of a module structure to support a structured programming of large systems, and by introduction of concepts for handling of concurrency.
- 10:15 - 10:30 am Coffee
- 10:30 - 12:00 noon Lilith: A Modula-2 Oriented Personal Computer
- The personal computer Lilith is a high performance graphic terminal with a high resolution bit map display. The hardware and instruction set of Lilith were developed to support the needs of the high-level language Modula-2. Some additional facilities were introduced to enable a comfortable user interface. The architecture will be described and some examples of user interface will be shown.
- 12:00 - 2:00 pm Lunch
- 2:00 - 3:30 pm Concepts and Implementation of Concurrency in Modula-1 and Modula-2.
- The language Modula-1 introduced a rigid concept of handling concurrency based on monitors by C. A. Hoare. Modula-2 supports only very low level primitives for concurrency. Both methods will be compared and some details of the implementation will be shown.
- 3:30 - 3:45 pm Coffee

3:45 - 5:15 pm Magnet: A Case Study of Influence of Modula-2 on Local Network Protocols.
 Magnet is an Ethernet-based local network connecting about 30 Liliths in the Institute for Informatics. The protocol design was heavily influenced by the language Modula-2. Some examples of such influence will be shown.

5:30 - 7:00 pm Dinner.

Tutorial on Language DIANA

Lecturer: Dr. Benjamin M. Bros gol
 Intermetrics, Inc.

7:00 - 9:00 pm Introduction to Language DIANA

DIANA is a high-level intermediate form for Ada programs that is useful for an Ada compiler and for other tools in an Ada programming environment. This tutorial will describe the background and motivation for the DIANA design, the definition and structure of DIANA, and its uses.

**International Workshop on
 High-Level Language Computer Architecture
 Technical Program**

Wednesday, December 1, 1982

8:30 - 9:00 am Registration

9:00 - 9:05 am Welcome from Workshop Chairman

9:05 - 9:15 am Message from Program Chairman

9:15 - 10:00 am Keynote Address
 Lt. Colonel Larry Druffel
 Ada Joint Program Office
 OUSDRE(R&AT)

10:00 - 10:30 am Coffee

10:30 - 12:30 pm Session A: "Ada and Architecture"
 Chairman: Dr. Lee Hoevel
 IBM T. J. Watson Research Center
 "An Ada Enhanced Execution Engine"
 J. W. Thomas and R. R. Ramseyer
 Honeywell, Systems and Research
 Center

"Design and Implementation of DIANA
 —Descriptive Intermediate Attributed
 Notation for Ada"
 Benjamin M. Bros gol
 Intermetrics, Inc.

"Columbia-Ada: A Concurrent Ada Com-
 puter System Organization"
 Yachan Chu and Marc Abrams
 University of Maryland

"Kernel Processor of Columbia-Ada
 Concurrent Architecture"

Yaohan Chu and Marc Abrams
University of Maryland

12:30 - 2:30 pm Lunch

2:30 - 5:00 pm Panel Session B: "Direction of High-Level Language Computer Architecture for DOD"

Chairman: Lt. Commander Jack Kramer
Ada Joint Program Office
OUSDRE(R&AT)

Panelists:

1. Col. Duane A. Adams
DARPA
2. Dr. William E. Carlson
Western Digital Corp.
3. Dr. Yaohan Chu
University of Maryland
4. Dr. Michael J. Flynn
Stanford University
5. Dr. Clarence Giese
AIRMICS
6. Mr. Dan Hammerstrom
Intel Corporation
7. Dr. Paul N. Hilfinger
University of California at Berkeley

6:00 - 8:00 pm Buffet Dinner

Thursday, December 2, 1982

8:30 - 10:00 am Session C: "Architectural Innovations for Performance"

Chairman: Dr. Leon S. Levy
Bell Telephone Laboratories

"Reconfigurable Network Architectured Computer Systems: An Environment for Parallel Computing"
J. C. Browne and G. J. Lipovski
The University of Texas at Austin

"A Fortran Optimized Machine — A High Performance, High Level Language Machine"
William C. Brantley and Joseph Weiss
IBM T. J. Watson Research Center

"The Vali Execution Tree"
James D. Mooney
West Virginia University

"The Evolution of Synthetic Calculus: A Mathematical Technology for Advanced Architecture"
Joseph Tharnes
Aerospace Corporation

10:00 - 10:30 am Coffee

10:30 - 12:00 noon Session D: "Hardware Issues"

Chairman: Dr. Leonard Haynes
National Bureau of Standards

"On A Grep Processor"
Leon S. Levy and Martin Freeman
Bell Laboratories

"Hardware Name-Mapping for Interpretive Execution of Block-Structure Languages"

K. J. Gough
Queensland Institute of Technology,
Australia

"Hardware Support Mechanisms for Concurrency Control in Local Computer Networks"
Carlton R. Covey and David Rennels
University of California at Los Angeles

12:00 - 2:00 pm Lunch

2:00 - 3:00 pm Session E: "Performance Evaluation of High Level Language Computer Architecture"

Chairman: Dr. Michael J. Flynn
Stanford University

"Performance Evaluation of the Execution Aspects of Computer Architecture"
Michael J. Flynn, Jerome C. Huck, Scott P. Wakefield, Robert G. Wedig
Stanford University

3:00 - 3:30 pm Coffee

3:30 - 5:30 pm Session F: "System and User Issues"

Chairman: Dr. Martin Freeman
Signetics Corp.

"DAWN: An Architecture Toward a Personal Inference Machine"
M. Yokota and M. Umemura
Nippon Electric Co., Ltd., Japan

"A FACIL Direct Execution Architecture"
D. Dromard and F. Dromard
Universite Pierre et Marie Curie, France

"Making Distributive Multicomputer Systems Safe and Programmable"
W. K. Gillo and P. M. Behr
Technical University of Berlin, West Germany

"The Verification of the Processor-Supported Protection Mechanisms in

"Higher-Level Language Machines"
 Virgil D. Gligor
 University of Maryland

"Implementing Code Reentrancy in
 Functional Programs on a Data Flow
 Computer System with a Paged
 Memory"

L. J. Caluwaerts, J. Debacker, J. A.
 Peperstraete

Katholieke Universiteit Leuven, Belgium

7:30 - 9:00 pm Panel Session G: Current status of the
 Aerospace Research Computer

Chairman: Arthur E. Speckhard
 Aerospace Corporation

Panelists:

Don Konold
 Aerospace Corporation

Richard Conn
 Fairchild Semiconductor

E. Dean Ernest
 Burroughs Corporation

Gyula Margo
 University of North Carolina

Major John Criscuolo
 USAF/SD

Lee Hoevel
 IBM T. J. Watson Research Center

Michael Flynn
 Stanford University

Friday, December 3, 1982

8:30 - 10:30 am Session H: "High-Level Language Computer Architecture"

Chairman: David Elliott Shaw
 Columbia University

"A Pascal Oriented Microprogrammed
 Processor"
 Jeremy Jones
 Trinity College, Ireland

"A Pascal Interactive Direct-Execution
 Computer: PASDEC"
 Kozo Itano
 The University of Tsukuba, Japan

"A Concept for Cooperating Reduction
 Machines"
 Werner E. Kluge
 Gesellschaft fur Mathematik und Daten-
 verarbeitung mbH Bonn, West Germany

"Flex: a working computer with an architecture based on procedure values"
 J. M. Foster, I. F. Currie and P. W.
 Edwards
 Royal Signals and Radar Establishment,
 United Kingdom

"Database Machines Viewed as High-level Language Computers"
 L. S. Haynes
 National Bureau of Standards

10:30 - 11:00 am Coffee

11:00 - 12:30 noon Session I: "Networking Language & Architecture"

Chairman: Dr. Dennis Allison
 Stanford University

"A New Language for Writing Portable and Secure Systems"
 Nagui Halim and John A. Pershing, Jr.
 IBM T. J. Watson Research Center

"Delft University NIL: DUNIL"
 Dr. A. J. van de Goor
 Technical University of Delft, Holland

12:30 - 2:00 pm Lunch

2:00 - 4:30 pm Visit to Gould, Inc., SEL Computer Systems Division and IBM Boca Raton.

WORKSHOP COMMITTEE

Yaohan Chu (Chairman)
 University of Maryland

Leonard Haynes
 National Bureau of Standards

Lee Hoevel
 IBM Research Center

Arthur E. Speckhard
 Aerospace Corp.

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